Clinical Classifications Software (CCS), 2003
Software and User's Guide

Overview

Clinical Classifications Software provides a way to classify diagnoses and procedures into a limited number of categories. CCS aggregates individual ICD-9-CM codes into broad diagnosis and procedure groups for statistical analysis and reporting. This document provides a description of the CCS categorization scheme. Electronic files containing the translation of ICD-9-CM diagnosis and procedure codes into CCS categories can be downloaded from this site. (CCS was formally called CCHPR, Clinical Classifications for Health Policy Research.)

CCS is continually updated. The current version is based on ICD-9-CM codes that are valid for January 1980 through September 2003. CCS consists of two related classification systems. The first system, called the *single level CCS*, groups diagnoses into mutually exclusive categories. The single-level diagnosis CCS aggregates illnesses and conditions into 259 mutually exclusive categories. Similarly, the single-level procedure CCS aggregates procedures into 231 mutually exclusive categories, most of which are homogeneous.

The second system expands the single-level CCS into a hierarchical system, called the *multi-level CCS*. The multi-level CCS groups single-level CCS categories into broader categories (e.g., Infectious Diseases, Mental Disorders, and Injury). It also splits single-level CCS categories to provide more detail about particular groupings of codes.

CCS documentation provides a listing of which ICD-9-CM codes are included in each CCS diagnosis and procedure category.

Purpose

CCS categories can be employed in many types of projects analyzing data on diagnoses and procedures. For example, they can be used to:

- identify cases for disease-specific or procedure-specific studies;
- gain a better understanding of an institution's or health plan's distribution of patients across disease or procedure groupings;
- provide statistical information on characteristics, such as charges and length of stay, about relatively specific conditions;
- cross-classify procedures by diagnoses to provide insight into the variety of procedures performed for particular diagnoses.

Diagnoses and procedures for hospital inpatient stays are coded using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Fifth Edition (Public Health Service and Health Care Financing Administration, 1994). ICD-9-CM consists of about 12,000 diagnosis codes and 3,500 procedure codes. Although it is possible to present

descriptive statistics for individual ICD-9-CM codes, it is often useful to aggregate codes into clinically meaningful categories that group similar conditions or procedures. For examples of the use of CCS categories, see Elixhauser and Steiner (1999); Cowen et al., 1998; Elixhauser, Steiner, Whittington, et al. (1998); Elixhauser and McCarthy (1996); Duffy, Elixhauser, and Sommers (1996); and Agency for Health Care Policy and Research (1996). These reports aggregate individual hospital stays into larger diagnosis and procedure groups for statistical analysis and reporting. CCS is distinguished from other grouping schemes because it does not confound diagnosis with treatment, but keeps diagnoses and procedures separate in two different classifications.

History of Development

Clinical Classifications for Health Policy Research (CCHPR) Version 1 was the initial endeavor to construct clinically meaningful categories of diagnoses and procedures. The determining factor in creating these categories was the extent to which conditions and procedures could be grouped into relatively homogeneous clusters of interest to public policy researchers. CCHPR Version 1 consisted of 185 summary diagnosis categories and 172 summary procedure categories (Elixhauser, Andrews, and Fox, 1993).

CCHPR Version 2 was derived from the Version 1 summary diagnosis and procedure categories. Version 1 categories were modified on the basis of clinical homogeneity, frequency of occurrence in inpatient discharge data, and ICD-9-CM coding changes. The number of discharges in all categories was computed using 1991 California hospital inpatient data on all-listed diagnoses and all-listed procedures from the Healthcare Cost and Utilization Project State Inpatient Databases (SID).

The modified CCHPR schemes went through reviews during which the categories and ICD-9-CM code assignments were evaluated for accuracy and clinical significance. The reviews were conducted by trained medical records personnel and a physician with experience in medical classification. During this review process, additional categories were created, other categories were collapsed, and codes were reassigned when appropriate.

Version 2 contained more categories than Version 1. Some conglomerate categories (e.g., "Other gastrointestinal procedures") and high-frequency categories (e.g., "Pregnancy-related conditions") were divided into smaller, more clinically homogeneous groups.

Beginning with the 1999 update, an additional classification scheme (the multi-level CCS) was introduced, E codes (external causes of injury) received special treatment, and the name was changed to Clinical Classification Software (CCS), reflecting the broader use of the classifications beyond health policy research.

Description

Single-Level CCS

The single-level diagnosis classification scheme aggregates illnesses and conditions into 259 mutually exclusive categories, most of which are clinically homogeneous. Some heterogeneous categories were necessary; these combine several less common individual conditions within a body system.

All codes in the diagnosis section of ICD-9-CM are classified. In previous versions of the system, E codes (External Causes of Injury and Poisoning) were not classified because they are used sporadically in inpatient data; hence they were lumped into a single category (CCS 260). Beginning with the 1999 version of the CCS, a classification system for E codes was incorporated. The E code classification was developed by staff at the Centers for Disease and Control and Prevention (Centers for Disease Control, 1997).

The single-level procedure classification scheme contains 231 mutually exclusive categories. Many of the categories represent single procedures; however, some procedures that occur infrequently are grouped according to the body system on which they are performed, whether they are used for diagnostic or therapeutic purposes, and whether they are considered operating room or non-operating room procedures according to diagnosis related groups definitions (DRGs: Diagnosis related groups definitions manual, 1994).

ICD-9-CM codes for the single-level diagnosis and procedure CCS categories are presented in Appendix A and Appendix B. The ICD-9-CM code assignments to each category are viewable in the accompanying executable files that provide the crosswalk from ICD-9-CM to CCS categories.

Multi-level CCS

The multi-level CCS is a hierarchical system based on the single-level CCS. Single-level CCS categories are grouped into broad categories and are split further into more detailed categories. The multi-level diagnosis CCS is split into four levels, while the multi-level procedure CCS is split into three levels. A multi-digit numbering system is used to identify the level of each hierarchical category.

For example, CCS category 99*. Hypertension with complications and secondary hypertension* is grouped with 98*. Essential hypertension* to form a broader category, called simply Hypertension. In addition, 99*. Hypertension with complications and secondary hypertension* is broken into several more homogeneous groups as shown below.

7 Diseases of the circulatory system
- 7.1 Hypertension
  - 7.1.1 Essential hypertension [98.]
  - 7.1.2 Hypertension with complications and secondary hypertension [99.]
    - 7.1.2.1 Hypertensive heart and/or renal disease
    - 7.1.2.2 Other hypertensive complications

7.2 Diseases of the heart

. . . .

In the multi-level CCS, original single-level CCS categories are labeled with the original CCS number in brackets following the CCS category name, e.g., "[98.]" and "[99.]" above.

ICD-9-CM codes for the multi-level diagnosis and procedure CCS categories are presented in Appendix C and Appendix D. Note that multi-level CCS categories are comprised of single-level CCS categories or ICD-9-CM codes. Construction of multi-level CCS requires that ICD-9-CM codes first be assigned to single-level CCS.

Warnings About ICD-9-CM Coding Changes

Time period covered by CCS

In order to keep abreast of yearly changes in the ICD-9-CM codes, the CCS categories are updated annually after code assignments are reviewed and agreement is reached among the developers and medical records personnel.

The ICD-9-CM codes are revised every October. New codes are added, existing codes are deleted, and definitions of current codes are changed. CCS categories are revised in response to ICD-9-CM changes. ***The 2003 version of the CCS is valid for the time period January 1980 through September 2003.*** Using these CCS categories with data outside this time period will result in misclassification of ICD-9-CM codes.

ICD-9-CM codes requiring special treatment

CCS accounts for all changes in ICD-9-CM coding definitions during this time period except for two codes whose meaning changed to such an extent that their CCS category assignment changed as well. These two codes must be explicitly assigned by the user when using older data. If you use more recent data (as described below) no special treatment is necessary. The codes are correctly assigned in the CCS program.

Assignment of these two codes requires information on the year and quarter of service. When using data that span the time periods described below, these ICD-9-CM codes must be assigned to CCS categories explicitly according to the year and quarter of the data.

- Special treatment is required for the following diagnosis code:

  From January 1980 to September 1993, ICD-9-CM diagnosis code '2510 ' should appear in CCS diagnosis category 50 (Diabetes mellitus with complications).

Beginning in October 1993, ICD-9-CM diagnosis code '2510 ' appears in CCS diagnosis category 51 (Other endocrine disorders). The current CCS program assigns this code to category 51.

- Special treatment is required for the following procedure code:

  From January 1980 to September 1989, ICD-9-CM procedure code '8159' should appear in CCS procedure category 153 (Hip replacement, total and partial).

  Beginning in October 1989, ICD-9-CM procedure code '8159' appears in CCS procedure category 154 (Arthroplasty, other than hip or knee). The current CCS program assigns this code to category 154.

Description of Downloadable Files

"Unzipping" files
There are two downloadable files, both self-extracting zipped files, called CCS.EXE (for the single-level CCS) and CCS_X.EXE (for the multi-level CCS) .

Single-level CCS
CCS.EXE contains two ASCII (DOS text) files that translate ICD-9-CM codes into single-level CCS categories and two ASCII (DOS text) files that provide descriptive labels for the single-level CCS categories. To use these zipped files, you must do the following:

1. Create a subdirectory (or folder) called CCS on your hard drive (e.g., MD C:\CCS). You will need a total of approximately 1,500,000 bytes free to accommodate all the files once they are unzipped.

2. Copy CCS.EXE to this subdirectory.

3. Expand the files:

- Using DOS: At the DOS prompt within this newly created directory, type CCS and hit the enter key (C:\CCS>CCS).
- Using Windows: Under "RUN" type C:\CCS\CCS

The self-extracting zipped file will unzip (expand for normal use) the following files. Note that the original file (CCS.EXE) will remain intact.

Filename	Purpose
Diagnosis CCS	

CCS DX REF.TXT	Translation file that maps ICD-9-CM diagnosis codes into single-level CCS diagnosis categories, with full information about each ICD-9-CM code and brief CCS labels.
CCS DX LABEL.TXT	Label file that contains the full descriptive single-level CCS diagnosis category names to use when reporting the diagnosis categories.
Procedure CCS	
CCS PR REF.TXT	Translation file that maps ICD-9-CM procedure codes into single-level CCS procedure categories, with full information about each ICD-9-CM code and brief CCS labels.
CCS PR LABEL.TXT	Label file contains the full descriptive single-level CCS procedure category names to use when reporting the procedure categories.

Multi-level CCS

CCS_X.EXE contains nine ASCII (DOS text) files that translate ICD-9-CM codes into multi-level CCS categories and two ASCII (DOS text) files that provide descriptive labels for the multi-level CCS categories. To use these zipped files, you must do the following:

1. Create a subdirectory (or folder) called CCS_X on your hard drive (e.g., MD C:\CCS_X). You will need a total of approximately 1,100,000 bytes free to accommodate all the files once they are unzipped.

2. Copy CCS_X.EXE to this subdirectory.

3. Expand the files:

- Using DOS: At the DOS prompt within this newly created directory, type CCS_X and hit the enter key (C:\CCS_X>CCS_X).
- Using Windows: Under "RUN" type C:\CCS_X\CCS_X

The self-extracting zipped file will unzip (expand for normal use) the following files. Note that the original file (CCS_X.EXE) will remain intact.

File name	Purpose
Multi-level Diagnosis CCS	

DXLEVL1.TXT	Translation file that maps level 2 multi-level CCS categories into level 1 multi-level CCS categories
DXLEVL2.TXT	Translation file that maps single-level CCS categories into level 2 multi-level CCS categories
DXLEVL3.TXT	Translation file that maps single-level CCS categories into level 3 multi-level CCS categories
$DXLVL3.TXT	Translation file that maps ICD-9-CM codes into level 3 multi-level CCS categories
$DXLVL4.TXT	Translation file that maps ICD-9-CM codes into level 4 multi-level CCS categories
DXMLABEL.TXT	Label file contains the full descriptive multi-level CCS diagnosis category names to use when reporting the diagnosis categories.
Multi-level Procedure CCS	
PRLEVL1.TXT	Translation file that maps level 2 multi-level CCS categories into level 1 multi-level CCS categories
PRLEVL2.TXT	Translation file that maps single-level CCS categories into level 2 multi-level CCS categories
PRLEVL3.TXT	Translation file that maps single-level CCS categories into level 3 multi-level CCS categories
$PRLVL3.TXT	Translation file that maps ICD-9-CM codes into level 3 multi-level CCS categories
PRMLABEL.TXT	Label file contains the full descriptive multi-level CCS procedure category names to use when reporting the procedure categories.

Using translation files

For the single-level CCS, the translation files translate specific ICD-9-CM codes into CCS categories. The multi-level CCS is based upon the single-level CCS, so you must first assign single-level CCS categories in your data; then multi-level CCS categories can be created. (This process to used to avoid redundancy in ICD codes and massive translation files.)

How you use these files will depend on the software system being used. For example, if you are using SAS, you can adapt these translations to create a SAS PROC FORMAT. If you are using SPSS, you can adapt these translations into VALUE LABELS or into a series of recodes.

Representation of ICD-9-CM diagnosis codes

In practice, ICD-9-CM diagnoses are represented by 3- to 5-character codes with explicit decimals. In the files you downloaded and in the vast majority of data files, ICD-9-CM diagnoses are represented as 5-character alphanumeric codes with implicit decimals. (Alphanumeric codes are always enclosed in quotation marks.) Examples are given below.

Condition	ICD-9-CM diagnosis code	Alpha code (implicit decimals)
Pneumococcal pneumonia	481	'481 '
Pneumonia due to Klebsiella pneumoniae	482.0	'4820 '
Pneumonia due to Escherichia coli	482.82	'48282'
Single liveborn infant, born in hospital, delivered by cesarean delivery	V30.01	'V3001'

For proper handling of diagnosis codes:

- Alphanumeric diagnosis codes must be left-justified so that there are 2 spaces following a 3-character diagnosis code and 1 space following a 4-character diagnosis code.

- Trailing blanks should never be zero-padded (filled with zeroes so that all 5 characters are filled for codes that should be 3 or 4 characters long).

- Lending zeroes must be preserved; they are significant.

Representation of ICD-9-CM procedure codes

In practice, ICD-9-CM procedures are represented by 3- or 4-character codes with explicit decimals. In the accompanying files and in the vast majority of data files, ICD-9-CM procedures are represented as 4-character alphanumeric codes with implicit decimals. (Alphanumeric codes are always enclosed in quotation marks.) Examples are given below.

Procedure	ICD-9-CM procedure code	Alpha code (implicit decimals)
Incision of prostate	60.0	'600 '
Closed biopsy of prostate	60.11	'6011'

For proper handling of procedure codes:

- Alphanumeric procedure codes must be left-justified, so that there is always 1 space following a 3-character procedure code.

- Trailing blanks should never be zero-padded (filled with zeroes so that all 4 characters are filled for codes that should be 3 characters long).

- Lending zeroes must be preserved; they are significant.

References

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